

**Notice of Allowability**

Application No.

10/037,806

Examiner

Midys Rojas

Applicant(s)

BONOLA, THOMAS J.

Art Unit

2185

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the communication filed on 12/15/05.
2. ☒ The allowed claim(s) is/are 1,3-32,39 and 40.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of the:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached  
1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.  
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)                                  |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date <u>03/06/06</u> . |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment  |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance                         |
|   | 9. <input type="checkbox"/> Other _____  |

### DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/15/05 has been entered.

### EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mark E. Scott (43,100) on 03/06/06.

The application has been amended as follows:

1. (Currently Amended) A method comprising:  
performing, ~~by a software stream,~~ heap memory operations on a first end of a linked list of free heap memory of a heap pile by a software stream executed on a processor,  
the performing by the software stream using an atomic operation; and  
concurrently  
returning a return block of heap memory, ~~by a hardware device that used the return block of heap memory,~~ to the heap pile at a second end of the linked list of free heap memory by a hardware device coupled to the processor, the returning by the hardware device using a non-atomic operation.
12. (Currently Amended) A method of managing a heap memory comprising:

maintaining unused blocks of heap memory as a linked list, and wherein the unused blocks of the linked list comprise a first block at a beginning of the linked list, a second block pointed to the first block, and a third block at an end of the linked list;

removing, by a software stream executed on a processor and using an atomic operation, the first block from the linked list, thus making the second block the beginning of the linked list; and

returning a return block, by a hardware device coupled to the processor that used the return block, to the linked list by placing the return block at the end of the linked list with a non-atomic operation.

19. (Currently Amended) A method of managing a heap memory in a computer system, the method comprising:

allowing a software thread executed on a processor to add and remove blocks of heap memory from a linked list of free blocks of heap memory in a last-in/first-out (LIFO) fashion at a first end of the linked list and using an atomic operation; and

allowing a hardware device that uses blocks of heap memory to add the blocks of heap memory to the linked list of free blocks of heap memory at a second end of the linked list using a non-atomic operation, the hardware device coupled to the processor by way of a communication bus.

29. (Currently Amended) A computer system comprising:

a microprocessor executing a software stream;

a main memory array, a portion of the main memory array allocated to be a heap memory, and wherein unused portions of the heap memory are part of a heap pile, the heap pile further comprising

a plurality of blocks;

each block having a next block field; and

wherein the heap pile is maintained as a linked list, each block's next block field pointing to a next block in the list;

a first bridge logic device coupling the microprocessor to the main memory array;

a hardware device coupled to the heap memory through the first bridge logic device;

Art Unit: 2185

wherein the software stream executed on the microprocessor removes blocks of heap memory from a beginning of the heap pile using an atomic operation; and simultaneously

the hardware device returns blocks of heap memory used by the hardware device to an end of the heap pile using a non-atomic operation.

39. (Currently Amended) A method comprising:

performing, by a software stream executed on a processor, heap memory operations on a first end of a linked list of free heap memory of a heap pile, the performing using an atomic operation; and concurrently

returning a return block of heap memory to the heap pile at a second end of the linked list of free heap memory, the returning by a hardware device coupled to the processor using a non-atomic operations and selected from group consisting of a graphics card, a network interface card, an audio device or a mass storage device.

41. (Cancelled)

42. (Cancelled)

### *Allowable Subject Matter*

3. The following is an examiner's statement of reasons for allowance:

The Prior Art of Record does not teach nor suggest in the claimed combination performing heap memory operations on a first end of a linked list of a heap memory by a software stream on a processor using an atomic operation, and returning a return block of heap memory at a second end of the linked list by a hardware device coupled to the processor using a non-atomic operation.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

Art Unit: 2185

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Midys Rojas whose telephone number is (571) 272-4207. The examiner can normally be reached on M-F 5:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (571) 272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

March 6, 2006

*Midys Rojas*  
Midys Rojas  
Examiner  
Art Unit 2185

MR

*Mano Padmanabhan*  
3/6/06

MANO PADMANABHAN  
SUPERVISOR, PATENT EXAMINER